CLAIMS

What is claimed is:

1.   A method of communicating a message from a transmitting station to a receiving station, the method comprising:

5   adaptively selecting a retransmission protocol from two or more retransmission protocols based on at least one changing transmission variable.

2.   The method of claim 1 wherein adaptively selecting said retransmission protocol from two or more retransmission protocols based on at least one changing transmission variable

10   comprises adaptively selecting a retransmission protocol based on a change in a channel quality between a first transmission of said message and a subsequent transmission of said message.

3.   The method of claim 2 wherein adaptively selecting said retransmission protocol based on the change in said channel quality between said first transmission of said message and said

15   subsequent transmission of said message comprises adaptively selecting said retransmission protocol based on a change in a signal to noise ratio between said first transmission of said message and said subsequent transmission of said message.

4.   The method of claim 2 wherein adaptively selecting said retransmission protocol based

20   on the change in said channel quality between said first transmission of said message and said subsequent transmission of said message comprises adaptively selecting said retransmission protocol based on a change in an effective signal to noise ratio between an average of one or more transmissions of said message and said subsequent transmission of said message.

25   5.   The method of claim 2 wherein adaptively selecting said retransmission protocol from two or more retransmission protocols based on at least one changing transmission variable further comprises adaptively selecting said retransmission protocol based on a coding rate used for said first transmission of said message.

6.   The method of claim 1 wherein adaptively selecting said retransmission protocol from two or more retransmission protocols based on at least one changing transmission variable comprises adaptively selecting said retransmission protocol based on a coding rate used for a

5   first transmission of said message.

7.   The method of claim 1 wherein adaptively selecting said retransmission protocol from two or more retransmission protocols based on at least one changing transmission variable comprises determining a relative protocol gain between said two or more retransmission

10   protocols and adaptively selecting said retransmission protocol based on said relative protocol gain.

8.   The method of claim 7 further comprising storing pre-computed relative protocol gains corresponding to different values of said at least one changing transmission variable in a

15   memory.

9.   The method of claim 8 wherein determining said relative protocol gain between said two or more retransmission protocols comprises selecting said relative protocol gain from said pre-computed relative protocol gains stored in memory based on at least one changing transmission

20   variable.

10.   The method of claim 8 wherein determining said relative protocol gain between said two or more retransmission protocols comprises selecting two or more pre-computed relative protocol gains stored in said memory and interpolating between the selected pre-computed

25   relative protocol gains based on at least one changing transmission variable.

11.   The method of claim 1 wherein adaptively selecting said retransmission protocol from two or more retransmission protocols based on at least one changing transmission variable

comprises adaptively selecting one of an incremental redundancy protocol and a repetition

protocol based on said at least one changing transmission variable.

12.   The method of claim 11 wherein adaptively selecting said repetition protocol comprises

5   adaptively selecting a Chase Combining protocol.

13.   A method of communicating a message from a transmitting station to a receiving station comprising:

transmitting a first version of said message in a first transmission; and

retransmitting said message in a second transmission, wherein retransmitting said

5   message comprises selectively transmitting either said first version of said

message or a second version of said message based on at least one changing

transmission variable.

14.   The method of claim 13 further comprising determining a change in a channel quality

10   between said first transmission and said second transmission of said message and selectively

transmitting either said first version of said message or said second version of said message

based on the change in said channel quality.

15.   The method of claim 14 wherein selectively transmitting either said first version of said

15   message or said second version of said message based on the change in said channel quality

comprises selectively transmitting either said first version of said message or said second

version of said message based on a change in a signal to noise ratio.

16.   The method of claim 15 wherein selectively transmitting either said first version of said

20   message or said second version of said message based on the change in the signal to noise

ratio comprises selectively transmitting either said first version of said message or said second

version of said message based on a change in an effective signal to noise ratio

17.   The method of claim 13 wherein selectively transmitting either said first version of said

25   message or said second version of said message comprises selectively transmitting either said

first version of said message or said second version of said message based on an initial coding

rate for said first transmission.

18.   The method of claim 13 further comprising generating said first and second versions of said message and storing said first and second versions of said message in respective first and second buffers before said first transmission.

5   19.   The method of claim 13 further comprising generating said first version of said message before said first transmission and generating said second version of said message after said first transmission.

20.   The method of claim 13 wherein retransmitting said message in said second

10   transmission comprises selectively retransmitting said message according to either a first retransmission protocol or a second retransmission protocol based on at least one changing transmission variable.

21.   The method of claim 20 wherein selectively retransmitting said message according to

15   either said first retransmission protocol or said second retransmission protocol based on at least one changing transmission variable comprises determining a relative protocol gain between said first retransmission protocol and said second retransmission protocol and selectively retransmitting said message based on said relative protocol gain.

20   22.   The method of claim 21 further comprising storing pre-computed relative protocol gains for different values of said at least one transmission variable in a memory.

23.   The method of claim 22 wherein determining said relative protocol gain between said first retransmission protocol and said second retransmission protocol comprises selecting said

25   relative protocol gain from said pre-computed relative protocol gains stored in said memory based on at least one changing transmission variable.

24.   The method of claim 22 wherein determining said relative protocol gain between said first retransmission protocol and said second retransmission protocol comprises selecting two or more pre-computed relative protocol gains stored in said memory and interpolating between said selected pre-computed relative protocol gains based on at least one changing transmission

5   variable.

25.   The method of claim 20 wherein selectively retransmitting said message according to either said first retransmission protocol or said second retransmission protocol based on at least one changing transmission variable comprises selectively retransmitting said message

10   according to either an incremental redundancy protocol or a repetition protocol.

26.   The method of claim 13 wherein transmitting said first version of said message in said first transmission comprises transmitting a self-decodable message comprising systematic bits and redundant bits.

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27.   The method of claim 26 wherein transmitting said second version of said message in said second transmission comprises transmitting additional redundant bits not contained in said first version of said message.

20   28.   The method of claim 27 wherein said second version of said message further comprises systematic bits and is self-decodable.

29.   The method of claim 27 wherein said second version of said message is not self-decodable.

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30.   A wireless communication terminal comprising:

a transmitter to transmit a message to a receiving station; and

a controller connected to said transmitter to adaptively select a retransmission protocol

from two or more retransmission protocols based on at least one changing

5   transmission variable.

31.   The wireless communication terminal of claim 30 wherein said controller adaptively

selects said retransmission protocol from two or more retransmission protocols based on a

change in channel quality between a first transmission of said message and a second

10   transmission of said message.

32.   The wireless communication terminal of claim 31 wherein said change in channel quality

comprises a change in a signal to noise ratio between said first transmission of said message

and said second transmission of said message and wherein said controller adaptively selects

15   said retransmission protocol from two or more retransmission protocols based on the change in

said signal to noise ratio.

33.   The wireless communication terminal of claim 30 wherein said controller adaptively

selects said retransmission protocol from two or more retransmission protocols based on a

20   coding rate used for a first transmission of said message.

34.   The wireless communication terminal of claim 30 wherein said controller determines a

relative protocol gain between two or more retransmission protocols and adaptively selects said

retransmission protocol from said two more retransmission protocols based on said relative

25   protocol gain.

35.   The wireless communication terminal of claim 34 further comprising a memory to store

pre-computed relative protocol gains for different values of said at least one changing

transmission variable.

5   36.   The wireless communication terminal of claim 35 wherein said controller determines said

relative protocol gain from said pre-computed relative protocol gains stored in said memory.

37.   The wireless communication terminal of claim 36 wherein said controller determines said

relative protocol gain from said pre-computed relative protocol gains stored in said memory by

10   interpolating between two or more of said pre-computed relative protocol gains stored in said

memory based on at least one changing transmission variable.

38.   The wireless communication terminal of claim 30 wherein said two or more

retransmission protocols comprise an incremental redundancy protocol and a repetition protocol.

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39.   The wireless communication terminal of claim 38 wherein said repetition protocol

comprises a Chase Combining protocol.

40.   The wireless communication terminal of claim 30 wherein the wireless communication

20   terminal comprises part of a radio base station.

41.   The wireless communication terminal of claim 30 wherein the wireless communication

terminal comprises part of a mobile terminal.

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42.   A wireless communication terminal comprising:

a transmitter; and

a controller adaptively controlling said transmitter to:

transmit a first version of a message in a first transmission; and

5   selectively transmit in a second transmission either said first version of said

message or a second version of said message based on at least one

changing transmission variable.

43.   The wireless communication terminal of claim 42 wherein said controller adaptively

10   controls said transmitter to selectively transmit in said second transmission either said first

version of said message or said second version of said message based on an initial coding rate

used for said first transmission of said message.

44.   The wireless communication terminal of claim 42 wherein said controller determines a

15   change in a channel quality between said first transmission and selects either said first version

of said message or said second version of said message for said second transmission based on

said change in channel quality.

45.   The wireless communication terminal of claim 44 wherein said change in said channel

20   quality comprises a change in a signal to noise ratio between said first transmission and said

second transmission.

46.   The wireless communication terminal of claim 44 wherein said controller selects either

said first version of said message or said second version of said message for said second

25   transmission based on an initial coding rate used for said first transmission of said message.

47.   The wireless communication terminal of claim 42 wherein said first version of said message comprises systematic bits and redundant bits and wherein said second version of said message comprises additional redundant bits not included in said first version of said message.

5   48.   The wireless communication terminal of claim 47 wherein said second version of said message includes systematic bits and is self-decodable.

49.   The wireless communication terminal of claim 47 wherein said second version of said message is not self-decodable.

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50.   The wireless communication terminal of claim 42 further comprising at least one buffer to store said first and second versions of said message before said first transmission.

51.   The wireless communication terminal of claim 50 further comprising a switch operated by
15   said controller to adaptively select either said first or second versions of said message from said buffer.

52.   The wireless communication terminal of claim 42 wherein said wireless communication terminal comprises part of a radio base station.

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53.   The wireless communication terminal of claim 42 wherein said wireless communication terminal comprises part of a mobile terminal.

54.   A control circuit for a transmitter comprising:

a logic circuit to adaptively select a retransmission protocol from two or more

retransmission protocols based on at least one changing transmission variable.

5   55.   The control circuit of claim 54 wherein said logic circuit adaptively selects said

retransmission protocol from two or more retransmission protocols based on a change in a

channel quality between a first transmission of said message and a second transmission of said

message.

10   56.   The control circuit of claim 55 wherein said change in said channel quality comprises a

change in a signal to noise ratio between said first transmission of said message and said

second transmission of said message and wherein said logic circuit adaptively selects said

retransmission protocol from two or more retransmission protocols based on the change in said

signal to noise ratio.

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57.   The control circuit of claim 55 wherein said change in said channel quality comprises a

change in an effective signal to noise ratio comparing an average of multiple transmission of

said message to said second transmission of said message, and wherein said logic circuit

adaptively selects said retransmission protocol from two or more retransmission protocols based

20   on the change in said effective signal to noise ratio.

58.   The control circuit of claim 54 wherein said logic circuit adaptively selects said

retransmission protocol from two or more retransmission protocols based on a coding rate used

for said first transmission of said message.

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59.   The control circuit of claim 54 wherein said logic circuit determines a relative protocol

gain between said two or more retransmission protocols and adaptively selects said

retransmission protocol from said two more retransmission protocols based on said relative protocol gain.

60.   The control circuit of claim 54 further comprising a memory to store pre-computed

5   relative protocol gains for different values of said at least one changing transmission variable.

61.   The control circuit of claim 60 wherein said logic circuit determines said relative protocol gain from said pre-computed relative protocol gains stored in said memory based on at least one changing transmission variable.

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62.   The control circuit of claim 61 wherein said logic circuit determines said relative protocol gain from said pre-computed relative protocol gains stored in said memory by interpolating between two or more of said pre-computed relative protocol gains stored in said memory based on at least one changing transmission variable.

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63.   The control circuit of claim 54 wherein said logic circuit selects between an incremental redundancy protocol and a repetition protocol.

64.   The control circuit of claim 63 wherein said repetition protocol comprises a Chase

20   Combining protocol.

65.   The control circuit of claim 54 wherein said control circuit comprises a part of an ASIC.

66.   A transmitter circuit comprising:

a signal processing circuit to generate a first version of a coded message for

transmission in a first transmission and a second version of said coded message;

a control circuit to adaptively select either said first version of said coded message or

5   said second version of said coded message for transmission in a second

transmission based on at least one changing transmission variable.

67.   The transmitter circuit of claim 66 wherein said control circuit selects either said first

version of said message or said second version of said message for said second transmission

10   based on an initial coding rate used for said first transmission of said message.

68.   The transmitter circuit of claim 66 wherein said control circuit determines a change in a

channel quality between said first transmission and said second transmission and selects either

said first version of said message or said second version of said message for said second

15   transmission based on said change in said channel quality.

69.   The transmitter circuit of claim 68 wherein said change in said channel quality comprises

a change in a signal to noise ratio between said first transmission and said second transmission.

20   70.   The transmitter circuit of claim 68 wherein said change in said channel quality comprises

a change in an effective signal to noise ratio comparing an average of multiple transmission of

said message to said second transmission of said message.

71.   The transmitter circuit of claim 68 wherein said control circuit adaptively selects either

25   said first version of said message or said second version of said message for said second

transmission based on an initial coding rate used for said first transmission of said message.

72.   The transmitter circuit of claim 66 wherein said first version of said message comprises systematic bits and redundant bits and wherein said second version of said message comprises additional redundant bits not included in said first version of said message.

5   73.   The transmitter circuit of claim 72 wherein said second version of said message includes systematic bits and is self-decodable.

74.   The transmitter circuit of claim 72 wherein said second version of said message is not self-decodable.

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75.   The transmitter circuit of claim 66 further comprising at least one buffer to store said first and second versions of said message before said first transmission.

76.   The transmitter circuit of claim 75 further comprising a switch operated by said control
15   circuit to adaptively select either said first or second versions of said message from said buffer.

77.   The transmitter circuit of claim 66 wherein said transmitter circuit comprises a part of an ASIC.

20   78.   The transmitter circuit of claim 66 wherein said transmitter circuit comprises a part of a base station.

79.   The transmitter circuit of claim 66 wherein said transmitter circuit comprises a part of a mobile terminal.

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80.   A computer readable medium storing a computer program that controls operation of a transmitter, said computer program causing the transmitter to:

adaptively select a retransmission protocol for transmitting a message from two or more retransmission protocols based on at least one changing transmission variable.

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81.   The computer readable medium of claim 80 wherein said computer program causes said transmitter to adaptively select said retransmission protocol from two or more retransmission protocols based on a change in a channel quality between a first transmission of said message and a second transmission of said message.

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82.   The computer readable medium of claim 81 wherein said change in said channel quality comprises a change in a signal to noise ratio between said first transmission of said message and said second transmission of said message and wherein said computer program causes said transmitter to select said retransmission protocol from two or more retransmission protocols

15   based on the change in said signal to noise ratio.

83.   The computer readable medium of claim 81 wherein said change in said channel quality comprises a change in an effective signal to noise ration comparing an average of multiple transmission of said message to said second transmission of said message, and wherein said

20   computer program causes said transmitter to select said retransmission protocol from two or more retransmission protocols based on the change in said effective signal to noise ratio.

84.   The computer readable medium of claim 80 wherein said computer program causes said transmitter to adaptively select said retransmission protocol from two or more retransmission

25   protocols based on a coding rate used for a first transmission of said message.

85.   The computer readable medium of claim 80 wherein said computer program causes said transmitter to adaptively select between a repetition protocol and an incremental redundancy protocol.

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86. A computer readable medium storing a computer program that controls operation of a

transmitter, said computer program causing the transmitter to:

      transmit a first version of a coded message in a first transmission;

      selectively transmit in a second transmission either said first version of said coded

5   message or a second version of said coded message based on at least one

             changing transmission variable.

87. The computer readable medium of claim 86 wherein said computer program causes said

transmitter to transmit in said second transmission either said first version of said coded

10   message or said second version of said coded message based on an initial coding rate used for

said first transmission of said coded message.

88. The computer readable medium of claim 86 wherein said computer program causes said

transmitter to transmit in said second transmission either said first version of said coded

15   message or said second version of said coded message based on a change in a channel quality

between said first and second transmissions.

89. The computer readable medium of claim 88 wherein said change in said channel quality

comprises a change in a signal to noise ratio between said first transmission and said second

20   transmission and wherein said computer program causes said transmitter to transmit in said

second transmission either said first version of said coded message or said second version of

said coded message based on the change in said signal to noise ratio.

90. The computer readable medium of claim 88 wherein said change in said channel quality

25   comprises a change in an effective signal to noise ratio comparing an average of multiple

transmission of said message to said second transmission of said message, and wherein said

computer program causes said transmitter to transmit in said second transmission either said

first version of said coded message or said second version of said coded message based on the

change in said effective signal to noise ratio.

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